CLAIMS

1. An active muscle display unit comprising multiple electrodes that are arranged on a skin surface, a surface electromyogram measuring part that measures a surface electromyogram on the skin surface at the multiple electrodes, a motor unit separating part that estimates an individual motor unit constituting an active muscle based on the surface electromyogram measured by the surface electromyogram measuring part, a motor unit position estimating part that estimates a position of the firing motor unit based on the motor unit estimated as the motor unit constituting the active muscle by the motor unit separating part, and a display part that displays the motor unit estimated by the motor unit position estimating part in an image.

2. The active muscle display unit described in claim 1, and characterized by that the motor unit separating part estimates the individual motor unit that shows a predetermined firing pattern from the surface electromyogram measured by the surface electromyogram measuring part based on a multi-channel blind deconvolution method.

3. The active muscle display unit described in claim 1, or 2, and characterized by comprising a motor unit firing pattern storing part that stores a distribution pattern of a firing interval and a surface electromyogram waveform of the motor unit based on physiological knowledge, and checking a time-

series signal of each electrodes separated by the motor unit separating part against the motor unit whose distribution pattern of the firing interval and the surface electromyogram waveform are stored, and if a distribution pattern of a firing interval and a surface electromyogram waveform of the time-series signal are in relationship to coincide with the stored distribution pattern of the firing interval and the stored surface electromyogram waveform, the time-series signal is specified as the motor unit.

4. The active muscle display unit described in claim 1, 2, or 3, and characterized by that the motor unit position estimating part solves an inverse problem of a partial differential equation that gives an electrostatic field to reproduce its electrode position potential based on an electrode position potential corresponding to the individual motor unit obtained by the motor unit separating part.

5. The active muscle display unit described in claim 1, 2, 3, or 4, and characterized by that the motor unit position estimating part estimates a current source by the use of the Poisson's equation to reproduce its potential based on an electrode position potential corresponding to the individual motor unit obtained by the motor unit separating part.

6. The active muscle display unit described in claim 1, 2, 3, 4, 5 or 6 and characterized by that comprising a conductance distribution model storing part that stores a conductance

distribution model wherein distribution and an arrangement of fat, bone, and muscle whose electrical conductance differs respectively in vivo are modeled in order that the motor unit position estimating part can solve an inverse problem.

7. The active muscle display unit described in claim 1, 2, 3, 4, 5, or 6, and characterized by that comprising a motor unit depolarization model storing part that stores a depolarization mode of a motor unit in order that the motor unit position estimating part can solve an inverse problem uniquely.

8. The active muscle display unit described in claim 1, 2, 3, 4, 5, 6, or 7, and characterized by that the above-mentioned multiple electrodes are arranged in an array.

9. The active muscle display unit described in claim 1, 2, 3, 4, 5, 6, 7, or 8, and characterized by that a high-pass filter that passes a signal having a frequency component not less than a predetermined frequency is arranged and the surface electromyogram measured by the surface electromyogram measuring part is passed through the high-pass filter.

10. The active muscle display unit described in claim 1, 2, 3, 4, 5, 6, 7, 8, or 9, and characterized by that the surface electromyogram measured by the surface

electromyogram measuring part is normalized to an average of 0, and a distribution of 1.

11. The active muscle display unit described in claim 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10, and characterized by that the motor unit separating part learns the surface electromyogram measured by the surface electromyogram measuring part under a predetermined condition and estimates the individual motor unit constituting the firing muscle based on the learned surface electromyogram.

12. The active muscle display unit described in claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, or 11, and characterized by that a muscle distribution model storing part that stores a muscle distribution model wherein a muscle fiber or a motor neuron constituting the motor unit is modeled is arranged and the display part displays the motor unit extracted by the motor unit position estimating part in a state overlapped with the muscle distribution model.

13. The active muscle display unit described in claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, or 12, and characterized by that a measurement monitoring part that outputs the surface electromyogram during measurement in an image while the surface electromyogram is measured is arranged and in case that the surface electromyogram that is estimated to be other than the motor unit is output in an image by the measurement monitoring part, the surface electromyogram

measuring part is set not to conduct the measurement.